AMENDMENTS TO THE CLAIMS

Claims 1-3 canceled.

4. (Currently Amended) A method for modeling a subject to obtain kinematic and kinetic data, the method comprising the steps of:

representing said subject by at least one body segment;

obtaining image device data from at least two image devices~~, said~~ of the at least one body segment ~~data~~ captured by the image devices at more than one time;

transforming said image device data into configuration data describing the position and orientation of each of the at least one body segment using quaternions; and

processing said configuration data to obtain kinematic and kinetic data about the subject.

5. (Previously Presented) The method of claim 4, wherein the step of transforming further comprises the steps of:

assigning at least one cluster of markers to each of the at least one body segment;

transforming said image device data into three dimensional position coordinates of the markers; and

processing said three dimensional position coordinates to obtain the position and orientation of each of the at least one cluster, thereby determining the position and orientation of each of the at least one body segment.

6. (Currently Amended) The method of claim 5, wherein, in the step of processing, ~~quanternions~~ the quaternions are utilized to determine the position and orientation of each of the at least one cluster.

7. (Previously Presented) The method of claim 5, wherein the step of transforming said image device data further comprises the steps of:

transforming said image device data into position and orientation data of the at least one cluster of markers; and

transforming said position and orientation data of the at least one cluster of markers into position and orientation data of the at least one body segment.

8. (Previously Presented) The method of claim 7, wherein the position and orientation data of the at least one body segment is initially determined by a pointer.

9. (Previously Presented) The method of claim 8, wherein the pointer includes a set of markers on a rigid plate.

10. (Previously Presented) The method of claim 9, wherein the step of transforming said position and orientation data further comprises the step of computing motion data by using a Rodrigues vector method to determine joint centers of rotation of the at least one body segment.

11. (Previously Presented) The method of claim 9, wherein the step of transforming said position and orientation data further comprises the step of utilizing anthropometric data of a subject to calculate inertial properties of the at least one body segment.

12. (Previously Presented) The method of claim 11, wherein the inertial properties include the mass of each body segment of the subject.

13. (Previously Presented) The method of claim 12, wherein the inertial properties include the center of mass of each of the body segment of the subject.

14. (Previously Presented) The method of claim 13, wherein the inertial properties include the mass-moment of inertia of each of the body segment of the subject.

15. (Previously Presented) The method of claim 4, wherein, in the step of processing, kinematic data include information regarding motion of the subject, and kinetic data include information regarding at least one torque and a force on the at least one body segment of the subject.

16. (Previously Presented) The method of claim 15, wherein, in the step of processing, kinetic data include information regarding at least one torque and a force exerted at the neck, shoulder, or lower-back region of the subject.

17. (Previously Presented) The method of claim 15, wherein, in the step of processing, kinetic data include information regarding at least one torque and a force exerted at the ankle, knee, and hip of the subject.

18. (Previously Presented) The method of claim 15, wherein, in the step of processing, the force includes a force exerted on the subject by a floor.

19. (Previously Presented) The method of claim 15, wherein, in the step of processing, a power profile and energy expenditure for upper and lower body segments and joints are computed.

20. (Previously Presented) The method of claim 15, wherein, in the step of processing, linear and angular momenta associated with the head, arm, and trunk of the subject are computed.

21. (Previously Presented) The method of claim 15, wherein, in the step of processing, linear and angular momenta associated with the foot, shank, thigh, and pelvis of the subject are computed.

22. (Previously Presented) The method of claim 15, wherein, in the step of processing, kinematic data include information regarding the head, arms, trunk, and pelvis of the subject for determining the upper body mobility of the subject.

23. (Previously Presented) The method of claim 15, wherein, in the step of processing, kinematic data include information regarding the feet, shanks, and thighs of the subject for determining the lower body mobility of the subject.

24. (Previously Presented) The method of claim 15, wherein the step of processing further comprises the step of calculating the center of mass of the subject.

25. (Currently Amended) A system for modeling a subject to obtain kinematic and dynamic data, the system comprising:

at least two image devices for obtaining image device data associated with at least one body segment representing said subject;

a transformation stage for transforming said image device data into configuration data describing the position and orientation of each of the at least one body segment using quaternions; and

an output stage for processing said configuration data to obtain kinematic and kinetic data about the subject.

26. (Previously Presented) The system of claim 25, further comprising at least one cluster of markers for each of the at least one body segment to obtain the image device data.

27. (Previously Presented) The system of claim 25, wherein the transformation stage comprises:

an array tracking module for transforming said image device data into position and orientation data of the at least one cluster of markers; and

a full body modeling module for transforming said position and orientation data of the at least one cluster of markers into position and orientation data of the at least one body segment.

28. (Previously Presented) The system of claim 27, wherein the position and orientation data of the at least one body segment is initially determined by a pointer.

29. (Previously Presented) The system of claim 28, wherein the pointer includes a set of markers on a rigid plate.

30. (Previously Presented) The system of claim 29, wherein the full body modeling module computes motion data by using a Rodrigues vector method to determine joint centers of rotation of the at least one body segment.

31. (Previously Presented) The system of claim 30, wherein the full body modeling module utilizes anthropometric data of a subject to calculate inertial properties of the at least one body segment.

32. (Previously Presented) The system of claim 31, wherein the inertial properties include the mass of each body segment of the subject

33. (Previously Presented) The system of claim 32, wherein the inertial properties include the center of mass of each of the body segment of the subject.

34. (Previously Presented) The system of claim 32, wherein the inertial properties include the mass-moment of inertia of each of the body segment of the subject.

35. (Previously Presented) The system of claim 25, wherein the output stage comprises:

a kinematic analysis module for providing information regarding the bodily motions of the subject; and

a kinetic analysis module for providing information regarding at least one torque and a force on the at least one body segment of the subject.

36. (Previously Presented) The system of claim 35, wherein the kinetic analysis module determines the torque and force exerted at the neck, shoulder, or lower-back region of the subject.

37. (Previously Presented) The system of claim 35, wherein the kinetic analysis module determines the torque and a force exerted at the ankle, knee, and hip of the subject

38. (Previously Presented) The system of claim 35, wherein the kinetic analysis module determines the force exerted on the subject by a floor.

39. (Previously Presented) The system of claim 35, wherein the kinetic analysis module calculates power profiles and energy expenditures for upper and lower body segments and joints.

40. (Previously Presented) The system of claim 35, wherein the kinetic analysis module calculates linear and angular momenta for the head, arms, and trunk of the subject.

41. (Previously Presented) The system of claim 35, wherein the kinetic analysis module calculates linear and angular momenta associated with the foot, shank, thigh, and pelvis of the subject.

42. (Previously Presented) The system of claim 35, wherein the kinematic analysis module provides kinematic information regarding the head, arms, trunk, and pelvis of the subject for determining the upper body mobility of the subject.

43. (Previously Presented) The system of claim 35, wherein the kinematic analysis module provides kinematic information regarding the feet, shanks, and thighs of the subject for determining the lower body mobility of the subject.

44. (Previously Presented) The system of claim 35, wherein the kinematic analysis module calculates the center of mass of the subject.

45. (Currently Amended) A body modeling system includes a user interface for displaying information about movements of a subject, said user interface comprising:

an input facility for loading kinetic and kinematic data of a subject;

an integrated animation facility for displaying an android whose movements are based on the loaded kinetic and kinematic data of the subject;

a plot facility for providing various plots associated with the loaded kinetic and kinematic data; and

a mathematical facility for performing computational analysis on the loaded kinetic and kinematic data, including time differentiation and integration utilizing the kinetic and kinematic data.

46. (Previously Presented) The user interface of claim 45, wherein the integrated animation facility provides a volume region to view the android.

47. (Previously Presented) The user interface of claim 46, wherein the integrated animation facility provides complete control of the model view point from any elevation and azimuth.

48. (Previously Presented) The user interface of claim 45, wherein the mathematical facility performs statistical analysis of the kinetic and kinematic data.

Claim 49 cancelled

50. (Currently Amended) The user interface of claim ~~49~~ 45, wherein the mathematical facility performs digital filtering and Fourier transforms utilizing the kinetic and kinematic data.

51. (Previously Presented) The user interface of claim 45, wherein the plot facility provides a form feature for creating a template of plots of any desired kinematic and kinetic data of the subject.

52. (Previously Presented) The user interface of claim 51, wherein the plot facility provides a plot page for displaying detailed plots of various elements of the kinetic and kinematic data.

53. (Previously Presented) The user interface of claim 52, wherein the plot facility allows zooming of the plots and perform various analysis.

54. (Currently Amended) A system for modeling a subject to obtain kinematic and dynamic data, the system comprising:

an input stage for obtaining image device data associated with at least one body segment representing said subject;

an array tracking module for transforming said image device data into position and orientation data of the at least one cluster of markers using quaternions;

a full body modeling module for transforming said position and orientation data of the at least one cluster of markers into position and orientation data of the at least one body segment;

a kinematic analysis module for processing said configuration data to obtain kinematic data;

a kinetic analysis module for ~~for~~ processing said configuration data to obtain kinetic data; and

a user interface for displaying the calculated kinematic and kinetic information of the subject.

55. (Previously Presented) The system of claim 54, wherein the position and orientation data of the at least one body segment is initially determined by a pointer.

56. (Previously Presented) The system of claim 55, wherein the pointer includes a set of markers on a rigid plate.

57. (Previously Presented) The system of claim 54, wherein the kinetic analysis module determines the torque and force exerted at the neck, shoulder, or lower-back regions of the subject.

58. (Previously Presented) The system of claim 54, wherein the kinetic analysis module determines the force exerted on the subject by a floor.

59. (Previously Presented) The system of claim 54, wherein the kinetic analysis module calculates power profiles and energy expenditures for upper and lower body segments and joints.

60. (Previously Presented) The system of claim 54, wherein the kinetic analysis module calculates linear and angular momenta for the head, arms, and trunk of the subject.

61. (Previously Presented) The system of claim 54, wherein the kinematic analysis module provides kinematic information regarding the head, arms, trunk, and pelvis of the subject for determining the upper body mobility of the subject.

62. (Previously Presented) The system of claim 54, wherein the kinematic analysis module provides kinematic information regarding the feet, shanks, and thighs of the subject for determining the lower body mobility of the subject.

63. (Previously Presented) The system of claim 54, wherein the kinematic analysis module calculates the center of mass of the subject.

64. (Previously Presented) The system of claim 54, wherein the user interface further comprises an integrated animation facility for displaying an android whose movements are based on the loaded kinetic and kinematic data of the subject.

65. (Previously Presented) The system of claim 64, wherein the user interface further comprises a plot facility for providing various plots associated with the loaded kinetic and kinematic data.

66. (Previously Presented) The system of claim 65, wherein the user interface further comprises a mathematical facility for performing computational analysis on the loaded kinetic and kinematic data.

67. (Currently Amended) A method for modeling a subject to obtain kinematic and kinetic data, the method comprising the steps of:

obtaining image device data associated with at least one body segment representing said subject;

transforming said image device data into position and orientation data of the at least one cluster of markers using quaternions;

transforming said position and orientation data of the at least one cluster of markers into position and orientation data of the at least one body segment;

processing said configuration data to obtain kinematic data;

processing said configuration data to obtain kinetic; and

displaying the calculated kinematic and kinetic data of the subject.

68. (Previously Presented) The method of claim 67 wherein, in the step of obtaining, the image device data is obtained using more than one image device.

69. (Previously Presented) The method of claim 67, wherein the position and orientation data of the at least one body segment is initially determined by a pointer.

70. (Previously Presented) The method of claim 67, wherein the pointer includes a set of markers on a rigid plate.

71. (Previously Presented) The method of claim 67, wherein, the step for processing said configuration data, kinetic data include information regarding at least one torque and a force exerted at the neck, shoulder, or lower-back regions of the subject.

72. (Previously Presented) The method of claim71, wherein, in the step of processing said configuration data the force includes a force exerted on the subject by a floor.

73. (Previously Presented) The method of claim 67, wherein, in the step of processing said configuration data, a power profile and energy expenditure for upper and lower body segments and joints are computed.

74. (Previously Presented) The method of claim 67, wherein, in the step of processing said configuration data to obtain kinetic data, linear and angular momenta for heads, arms, and trunk of the subject are computed.

75. (Previously Presented) The method of claim 67, wherein, in the step of processing said configuration data, kinematic data include information regarding the head, arms, trunk, and pelvis of the subject for determining the upper body mobility of the subject.

76. (Previously Presented) The method of claim 67, wherein, in the step of processing said configuration data, kinematic data include information regarding the feet, shanks, and thighs of the subject for determining the lower body mobility of the subject.

77. (Previously Presented) The method of claim 76, wherein the step of processing said configuration data to obtain kinematic data further comprises the step of calculating the center of mass of the subject.

78. (Previously Presented) The system of claim 67, wherein the step for displaying calculated kinematic and kinetic data further comprises the step of displaying an android whose movements are based on the loaded kinetic and kinematic data of the subject.

79. (Previously Presented) The system of claim 67, wherein the step for displaying calculated kinematic and kinetic data further comprises the step of providing various plots associated with the loaded kinetic and kinematic data.

80. (Previously Presented) The system of claim 67, wherein the step for displaying calculated kinematic and kinetic data further comprises the step of performing computational analysis utilizing the kinetic and kinematic data.